

534,911

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
27 May 2004 (27.05.2004)

PCT

(10) International Publication Number
WO 2004/043169 A1

- (51) International Patent Classification⁷: **A23L 1/221**, 1/226, A61K 7/16
- (21) International Application Number: PCT/GB2003/004838
- (22) International Filing Date: 10 November 2003 (10.11.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0226490.1 14 November 2002 (14.11.2002) GB
- (71) Applicant (for all designated States except US): **QUEST INTERNATIONAL B.V.** [NL/NL]; Huizerstraatweg 28, NL-1411 GP Naarden (NL).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **HAINES, Jan, Thomas** [GB/GB]; 6 Eggringe Singleton, Ashford, Kent TN23 4XT (GB).
- (74) Agent: **KEITH W NASH & CO**; 90-92 Regent Street, Cambridge CB2 1DP (GB).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **FLAVOUR COMPOSITIONS**

(57) Abstract: A flavour composition, which can contain no or substantially no cinnamic aldehyde, comprises cinnamic alcohol and eugenol, the cinnamic alcohol and eugenol together comprising at least 3 % by weight of the total weight of the composition, the weight ratio of cinnamic alcohol to eugenol being in the range 0.25:1 to 3.5:1. The composition has a cinnamon flavour and finds use in consumer products, particularly oral care products.

WO 2004/043169 A1

Flavour Compositions

Field of the Invention

This invention relates to flavour compositions and concerns flavour compositions having cinnamon flavour and also concerns consumer products, particularly but not exclusively oral care products, including the flavour compositions.

Background to the Invention

Cinnamon is a well known flavour type that is popular with consumers and is widely used in a range of consumer products including oral care products and chewing gum preparations. The desired cinnamon character can be incorporated into a flavour composition by use of cinnamic aldehyde. Cinnamic aldehyde may be used as cinnamic aldehyde itself or in the form of a natural oil containing cinnamic aldehyde, e.g. cinnamon bark oil derived from the inner bark of the *Cinnamomum Zeylandicum*, preferably the variety grown in Ceylon, or cassia oil (Chinese cinnamon oil) derived from the leaves of *Cinnamomum Cassia*.

Cinnamic aldehyde has been shown to have sensitiser properties, which means that use of cinnamic aldehyde (and oils containing cinnamic aldehyde) is limited in cosmetic and oral care products.

Summary of the Invention

In one aspect the present invention provides a flavour composition comprising cinnamic alcohol and eugenol, the cinnamic alcohol and eugenol together comprising at least 3% by weight of the total weight of the composition, the weight ratio of cinnamic alcohol to eugenol being in the range 0.25:1 to 3.5:1.

Surprisingly, it is found that such mixtures of cinnamic alcohol and eugenol provide a cinnamon flavour without requiring the presence of cinnamic aldehyde (either as such or in the form of a cinnamic aldehyde-containing oil).

A flavour composition in accordance with the invention desirably contains no or substantially no cinnamic aldehyde, with cinnamic aldehyde comprising less than 0.1% by weight of the composition, preferably less than 0.05% by weight of the composition, more preferably less than 0.001% by weight of the composition, and ideally being completely absent.

The cinnamic alcohol and eugenol together preferably comprise at least 5% by weight of the total weight of the composition and possibly significantly more, up to 100% in the extreme case. The amounts of cinnamic alcohol and eugenol in the composition can be varied as appropriate depending on other flavour characteristics required of the composition, as will be discussed below.

The weight ratio of cinnamic alcohol to eugenol may be at least 0.5:1, at least 0.75:1, at least 1:1, and possibly at least 1.5:1. The weight ratio of cinnamic alcohol to eugenol may be not more than 3:1, not more than 2.5:1, and possibly not more than 2:1. Appropriate ratios will again depend on other flavour characteristics required of the composition.

The eugenol may be present as eugenol itself and/or as an ingredient of essential oils and synthetic oils rich in eugenol (preferably containing at least 65% by weight of eugenol). Such oils include clove oils (which typically contain over 90% by weight of eugenol), cinnamon leaf oil, pimento oil etc.

For improved cinnamon flavour character, the composition preferably also includes capsicum and/or citrus oil, e.g. orange oil, lemon oil etc, with lime oil currently being favoured. Typically such optional additional materials are each present at a level of 1% by

weight or less of the total weight of the composition, with suitable levels again depending on other desired flavour attributes of the composition.

For enhanced cinnamon flavour properties, it is also useful for the composition to include one or more of the following materials: benzyl formate, methyl cinnamate, benzoin, ethyl phenyl glycidate, ginger oil, cinnamyl acetate and methyl heptenone. Such materials improve the cinnamon flavour character, and are listed in order of preference. Again, such materials are typically present in an amount of 1% by weight or less of the total weight of composition or less, e.g. 0.5% by weight or less. In some cases, even very small amounts, e.g. 0.1% by weight or less, can have a significant effect on the flavour properties of the composition.

The flavour composition typically also includes other flavour ingredients (which may be selected from the 400-500 or so flavour materials that are in current use when formulating flavour compositions) chosen to give desired overall flavour characteristics to the composition. It is unusual for an oral care flavour composition to have pure cinnamon flavour character, and more normally cinnamon character would be combined with one or more other flavour types, particularly aniseed, peppermint, menthol, spearmint, eucalyptus, wintergreen and/or clove.

The ingredients of the composition are known flavour materials which are readily available commercially in grades suitable for various intended purposes.

The flavour composition of the invention can be readily made by simply mixing the specified ingredients, as is well known to those skilled in the art.

The flavour compositions of the invention provide a useful alternative to cinnamic aldehyde and find application in a wide range of consumer products, particularly oral care products such as toothpastes, mouthwashes, breath sprays and breath freshening tablets. Also of interest are skin care products, e.g. lip care products such as lip balms, and chewing gums. The term "chewing gum" is intended also to encompass bubble gum.

Because the flavour compositions of the invention provide a cinnamon flavour without requiring the presence of cinnamic aldehyde, the undesirable sensitiser properties of cinnamic aldehyde can be avoided.

The present invention also includes within its scope consumer products, particularly oral care products, skin care products and chewing gums, including a flavour composition in accordance with the invention.

The consumer products may otherwise be of conventional composition and include the flavour composition in appropriate amount, as is well known to those skilled in the art. For example, a toothpaste formulation will typically include 0.5% to 1.5%, say about 1% by weight, of the flavour composition. A mouthwash will typically contain the flavour composition in an amount in the range 0.15% to 0.3% by weight. For a chewing gum, the composition of the invention may be present in an amount in the range 1.5% to 3% by weight.

The invention will be further illustrated by the following Examples of flavour compositions.

Table 1 gives details of 10 flavour compositions, with all amounts being weight percent. Examples A to G are flavour compositions in accordance with the present invention, while Examples H to J are comparative examples outside the scope of the invention. The flavour type of each example was assessed by trained and skilled oral care flavourists and the flavour type characteristics are indicated on the table. In the Table, BPC stands for British Pharmacopoeia, and DQ stands for Dental Quality.

The compositions were prepared by mixing the listed ingredients, with solid materials first being charged to a tank followed by the liquid ingredients. The resulting mixture was then stirred until a homogeneous solution was achieved. The solid materials used are menthol, cyclotene, ethyl maltol and vanillin. Benzoin is best pre-dissolved in one of the liquid ingredients prior to addition to the flavour.

Table 2 gives details of the ingredients used in the flavour examples.

TABLE 1

Ingredient (all amounts wt%)	Flavour Example A	Flavour Example B	Flavour Example C	Flavour Example D	Flavour Example E
Flavour Type (as assessed by oral care flavourists)	Peppermint Wintergreen Cinnamon	Spearmint Cinnamon	Menthol Peppermint Wintergreen Cinnamon	Menthol Cinnamon	Spearmint Wintergreen Cinnamon
ANETHOLE SYNTHETIC	9.4	10.5	13.5	9.5	10.5
ANISIC ALDEHYDE	0.2	0.2	0.2	0.2	0.2
BENZOIN Siam	0.03	0.05	0.02	0.1	0.03
BENZYL FORMATE	0.1	0.3	0.1	0.5	0.1
CAPSICUM OLEORESIN BPC	0.12	0.14		0.2	0.1
CARVONE DEXTRO	0.04	0.1	0.06	0.2	0.04
CINNAMIC ALCOHOL	2.9	7	2.2	11	9
CINNAMYL ACETATE	0.2	0.1	0.1	0.2	2.9
CLOVE oil terpeneless	2	4.5	0.5	8.9	5.9
CYCLOTENE	0	0.02	0	0.02	0
ETHYL MALTOL	0	0	0.06	0	0
ETHYL PHENYL GLYCIDATE	0.3	0.3	0.2	0.3	0.3
EUCALYPTOL	4	0	0.3	0	0
EUGENOL DQ	3.9	7	1.54	9	1
Lemon Spanish	0	0	0	0	0
LIME oil	0.2	0.52	0.2	0.7	0.2
MENTHOL LAEVO EXTRA	52.87	38	51	45	30
METHYL CINNAMATE	0.2	0.8	0.3	1	0.2
METHYL HEPTENONE PURE	0.02	0.04	0.02	0.04	0.02
METHYL SALICYLATE	15.2	1	14.8	3	31.51
Nutmeg	0	0	0	0	0
ORANGE CALIFORNIAN	0	0	0.5	0	0
PEPPERMINT American Yakima Rectified	4.5	5	6.38	3	1
SPEARMINT American Far West Native	3.82	24.43	8.02	7.14	7
Vanillin	0	0	0	0	0
	100	100	100	100	100
Eugenol + 91.5% clove oil = ΣE	5.73	11.12	2:00	17.14	6.40
Cinnamic alcohol + ΣE	8.63	18.12	4.2	28.14	15.40
Cinnamic alcohol : ΣE	0.51:1	0.63:1	1.1:1	0.64:1	1.41:1

TABLE 1 (continuation)

Ingredient (all amounts wt%)	Flavour Example F	Flavour Example G	Flavour Example H	Flavour Example I	Flavour Example J
Flavour Type (as assessed by oral care flavourists)	Cola	Cinnamon	Peppermint Wintergreen (Not enough alcohol and eugenol)	Peppermint Wintergreen Clove (Too much eugenol)	Peppermint Wintergreen Floral (Too much alcohol)
ANETHOLE SYNTHETIC	5	12	9.4	9.4	9.4
ANISIC ALDEHYDE	0		0.2	0.2	0
BENZOIN Siam	0.05	0.2	0.03	0	0
BENZYL FORMATE	0.2	1	0.1	0	0
CAPSICUM OLEORESIN BPC	0.1	0.2	0.12	0.12	0
CARVONE DEXTRO	0.1	0.4	0.04	0.04	0.04
CINNAMIC ALCOHOL	6	22	1	0.3	7
CINNAMYL ACETATE	0.1	0.4	0.2	0	0.3
CLOVE oil terpeneless	3.5	18	0	5	0
CYCLOTENE	0	0.04	0	0	0
ETHYL MALTOL	0	0	0	0	0
ETHYL PHENYL GLYCIDATE	0.1	0.3	0.3	0	0.3
EUCALYPTOL	0	0	4	4	4
EUGENOL DQ	1.5	12	0.5	3	0.5
Lemon Spanish	26.6	0	0	0	0
LIME oil	18	1.5	0.2	0	0.2
MENTHOL LAEVO EXTRA	10	10	52.87	51.94	48
METHYL CINNAMATE	0.3	1	0.2	0	0.2
METHYL HEPTENONE PURE	0	0.04	0.02	0	0.02
METHYL SALICYLATE	1	3	15.8	14	15.02
Nutmeg	1	0	0	0	0
ORANGE CALIFORNIAN	18	0	0	0	0
PEPPERMINT American Yakima Rectified	0	3	10	9	10
SPEARMINT American Far West Native	8.15	14.92	5.02	3	5.02
Vanillin	0.3	0	0	0	0
	100	100	100	100	100
Eugenol + 91.5% clove oil = ΣE	4.70	28.47	0.5	7.58	0.5
Cinnamic alcohol + ΣE	10.70	50.47	1.5	7.87	7.5
Cinnamic alcohol : ΣE	1.28:1	0.77:1	2:1	0.04:1	14:01

TABLE 2

Ingredient	Chemical Name	CAS Number	FEMA GRAS	Supplier
ANETHOLE SYNTHETIC (Trans)	p-Methoxy Propenyl Benzene	4180-23-8	2086	Millenium
ANISIC ALDEHYDE	p-Methoxybenzaldehyde	123-11-5	2670	R.C Treat & Co LTD
BENZON Siam	n/a	9000-72-0	2133	Kelly
BENZYL FORMATE	BENZYL FORMATE	104-57-4	2145	Haarmann & Reimer
CAPSICUM OLEORESIN BPC	n/a	8023-77-6	2234	Lionel Hitchin (Essential Oils) Ltd
CARVONE DEXTRO	d-1-methyl-4-isopropenyl-6-cyclohexen-2-one	2244-16-8	2249	H Reynaud et Fils
CINNAMIC ALCOHOL	trans-3-Phenyl-2-propen-ol	104-54-1	2294	Haarmann & Reimer
CINNAMYL ACETATE	3-phenyl-2-propenyl acetate	21040-45-9	2293	Haarmann & Reimer
CLOVE oil terpeneless	n/a (90.5-92.5% eugenol)	8000-34-8	2323	Fragrance Materials
CYCLOTENE	Methylcyclopentenolone	80-71-1	2700	R.C Treat & Co Ltd
ETHYL MALTOL	3-Hydroxy-2-ethyl-4-pyrone	4940-11-8	3487	Pfizer
ETHYL PHENYL GLYCIDATE	Ethyl-3-phenyl-2,3-epoxypropionate	121-39-1	2454	IFF
EUCALYPTOL (1,8-cineole)	1,8 Epoxy-para-menthane	470-82-6	2465	AMC Chemicals
EUGENOL DQ	2-methoxy-4-(2-propenyl)phenol	97-53-0	2467	Charabot
Lemon Spanish	n/a	84929-31-7	2625	IFF
LIME oil	n/a	8008-26-2	2631	Copeland
MENTHOL LAEVO	L-5-Methyl-2-(1-methylethyl) cyclohexanol	2216-51-5	2665	Helm
METHYL CINNAMATE	Methyl-3-Phenyl-2-propenylate	103-26-4	2698	Haarmann & Reimer
METHYL HEPTENONE PURE	6-Methyl-5-hepten-2-one	110-93-0	2707	BASF
METHYL SALICYLATE	2-Hydroxy methylbenzoate	119-36-8	2745	Rhodia
Nutmeg	n/a	8008-45-5	2793	IFF
ORANGE CALIFORNIAN	n/a	8008-57-9	2825	Charabot
PEPPERMINT American Yakima Rectified	n/a	8006-90-4	2848	Essex Labs Essential Oils & Extracts
SPEARMINT American Far West Native	n/a	8008-79-5	3032	Essex Labs Essential Oils & Extracts
Vanillin	4-Hydroxy-3-methoxy benzaldehyde	121-33-5	3107	Rhodia

CLAIMS

1. A flavour composition comprising cinnamic alcohol and eugenol, the cinnamic alcohol and eugenol together comprising at least 3% by weight of the total weight of the composition, the weight ratio of cinnamic alcohol to eugenol being in the range 0.25:1 to 3.5:1.
2. A composition according to claim 1, wherein the cinnamic alcohol and eugenol together comprise at least 5% by weight of the total weight of the composition.
3. A composition according to claim 1 or 2, wherein the weight ratio of cinnamic alcohol to eugenol is at least 0.5:1, at least 0.75:1, at least 1:1, and possibly at least 1.5:1.
4. A composition according to any one of the preceding claims, wherein the weight ratio of cinnamic alcohol to eugenol is not more than 3:1, not more than 2.5:1, and possibly not more than 2:1.
5. A composition according to any one of the preceding claims, wherein the composition also includes capsicum and/or citrus oil.
6. A composition according to claim 5, wherein the citrus oil comprises lime oil.
7. A composition according to any one of the preceding claims, wherein composition also includes one or more of the following materials: benzyl formate, methyl cinnamate, benzoin, ethyl phenyl glycidate, ginger oil, cinnamyl acetate and methyl heptenone.
8. A composition according to any one of the preceding claims, wherein the composition contains no or substantially no cinnamic aldehyde.
9. A consumer product including a flavour composition in accordance with any one of the preceding claims.

10. A consumer product according to claim 9, wherein the product is selected from oral care products, skin care products and chewing gums.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/04838

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L1/221 A23L1/226 A61K7/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CA 2 012 288 A (STERLING DRUG INC) 16 September 1990 (1990-09-16) abstract	1-10
Y	WO 98 54971 A (ECOSMART TECHNOLOGIES INC) 10 December 1998 (1998-12-10) page 5, line 11 -page 6, line 9	1-10
Y	S. ARCTANDER: "Perfume and Flavor Chemicals" 1969, S. ARCTANDER, MONCLAIR, N.J. (USA) XP002269972 examples 618,,1369	1-10

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the International search

12 February 2004

Date of mailing of the International search report

26/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Dauksch, H

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/04838

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CA 2012288	A	16-09-1990	CA 2012288 A1	16-09-1990
WO 9854971	A	10-12-1998	US 6004569 A	21-12-1999
			AT 253826 T	15-11-2003
			AU 729441 B2	01-02-2001
			AU 7251298 A	21-12-1998
			BR 9809945 A	01-08-2000
			CA 2291121 C	02-12-2003
			CN 1259018 T	05-07-2000
			DE 69819724 D1	18-12-2003
			EA 2159 B1	24-12-2001
			EP 0991320 A1	12-04-2000
			HU 0002833 A2	28-12-2000
			JP 3258340 B2	18-02-2002
			JP 2000513027 T	03-10-2000
			NO 995902 A	07-02-2000
			NZ 501217 A	24-11-2000
			PL 337222 A1	14-08-2000
			US 6183767 B1	06-02-2001
			WO 9854971 A1	10-12-1998
			US 6340710 B1	22-01-2002
			US 6376556 B1	23-04-2002
			US 6372801 B1	16-04-2002
			US 6331572 B1	18-12-2001
			US 6342535 B1	29-01-2002
			US 6329433 B1	11-12-2001
			US 6372803 B1	16-04-2002
			US 6333360 B1	25-12-2001
			US 6342536 B1	29-01-2002